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Remarks

The present response is to the Office Action mailed in the above-referenced case on November 03, 2006. Claims 32-51 are pending in the application. Applicant acknowledges that claims 39-45 and 49-51 have been withdrawn from consideration, and these claims are canceled herein. The Examiner rejects claims 32-38 and 46-48 under 35 U.S.C. 102(e) as being anticipated by Mess et al. (US 6,512,302 B2) hereinafter Mess. Claims 32, 36-38 and 46-48 are also rejected under 35 U.S.C. 102(e) as being anticipated by Baik et al. (US 6,841,863 B2) hereinafter Baik.

In response to the Examiner's rejections and statements, applicant herein amends the independent claims to positively recite the conductive heat transfer aspects between the die and the metal of the substrate. Therefore, dependent claims 33, 35 and 47 are herein canceled as their limitations have been added to the base claims by amendment. Applicant also presents arguments pointing out where the Examiner fails to address the limitations, as originally presented and how the art fails to teach or suggest said limitations.

In the Examiner's reasoning given in the present Office Action the Examiner alleges that the art of Mess teaches (figures 1 to 9) a semiconductor package, comprising: a die 108, 208 having electrical contact pads 110 for external connection and a height; and a predominantly metal substrate 300, 102 having a recessed area 214 with a depth at least equal to the height of the die; wherein the substrate comprises a dielectric layer on the recessed side insulating patterned circuitry 117 extending into the recessed area, the die mounted in the recessed area with electrical connections provided between the electrical contact pads of the die and the pattern circuitry in the recessed area.

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Applicant points out that nowhere in the Examiner's comments are the limitations of originally presented claim 35 and 47 dealt with. Said claims recite a heat transfer feature wherein vias are formed through the dielectric layer separating the metal substrate from the patterned circuitry, and a plurality of solder ball connections to the metal of the substrate from individual ones of the contact pads of the die, providing direct, conductive heat transfer between the die and the metal of the substrate."

Mess specifically teaches that vias 115 are provided to contain conductive leads of circuitry 116 and are well insulated from the substrate (col. 4, lines 40-45). Applicant believes the independent claims 32 and 46, as amended, are patentable over the art of Mess.

Regarding the art of Baik, the Examiner also fails to deal with limitations relating to heat transfer capabilities. Applicant points out that the art of Baik fails to mention vias formed for heat sink purposes anywhere in the disclosure. Applicant teaches faults with the sandwich type structure as taught in Baik wherein the sandwich structure is mechanically complex, and the components have different thermal TCE and often operate at different temperatures. Compared to a structure without a heatspreader, there is more stress on the die solder balls in the sandwich structure during thermal cycles and an increase in reliability failures. Baik clearly fails to consider heat conducting problems in the sandwich structure.

Therefore, applicant's independent claims 32 and 47, as amended, are clearly patentable over the art of Baik. Dependent claims 34, 36-38 and 48 are patentable on their own merits, or at least as depending from a patentable independent claim.

As all of the presented claims, as amended, have been shown to be patentable over the art, applicant respectfully requests the application be reconsidered and the case past quickly to issue.

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If there are any time extensions needed beyond any extension specifically requested with this amendment, such extension of time is hereby requested. If there are any fees due beyond any fees paid with this amendment, authorization is given to deduct such fees from deposit account 50-0534.

Respectfully Submitted,
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